# Mass transport in 2D Nanocapillaries


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Abstract

Isolated atomic planes (two-dimensional materials) can be reassembled into designer structures made layer by layer in a precisely chosen sequence. This is usually referred to as van der Waals heterostructures. Recently, our group has reported that using such van der Waals (vdW) assembly not only heterostructures but also two-dimensional voids (2D voids) could be created [1-2]. The latter can be viewed as if individual atomic planes were pulled out of a bulk crystal leaving an atomically-thin void behind. This technology offers the smallest possible empty spaces that can vary from just a few angstroms in height up to many nanometres, if required. On this basis, we investigated the mass transport under such strong confinement, including how ions and water transport differently inside angstrom-scale slits, how does confinement affect the dielectric properties of water, and how does capillary condensation happen at the real atomic scale, etc. With these knowledge, we are aiming to search for new phenomena and better fundamental understanding.


References


[1] Radha, B, *et al. Nature*, 538 (2016), 222.

[2] L Fumagalli, *et al. Science*, 360 (2018), 1339.


Figures

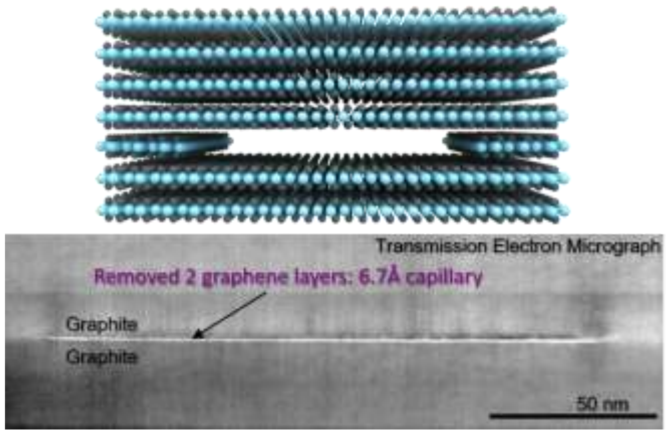


Figure 1: Schematics (up) and real cross-sectional view (down) of two-dimensional capillaries made by vdW assembly.